

Notice of Allowability

Application No.

09/992,578

Examiner

Krishnan S Menon

Applicant(s)

KOO ET AL.

Art Unit

1723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment of 12/16/04.
2. ☒ The allowed claim(s) is/are 1-8, 11-17, 19, 20 and 79; RENUMBERED 1-18.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Krishnan S. Menon
Patent Examiner

EXAMINER'S AMENDMENT

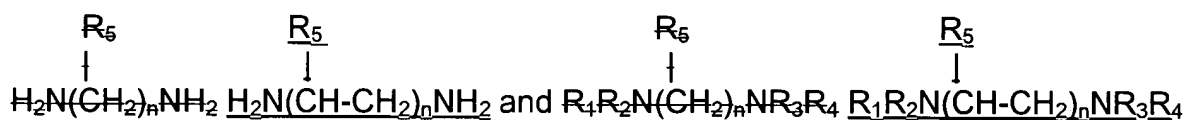
Claims 1-8, 11-17, 19, 20 and 58-61 were pending with the amendment of 12/16/04.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Edward M. Kriegsman on 1/12/05.

The application has been amended as follows:

The penultimate paragraph on page 18 of the specification is amended as follows, to correct the number of bonds of the carbon having the pendent group R₅ in the general formulae of the polyamines:



wherein n=2-12 and R₁, R₂, R₃, R₄ and R₅ are the same or different and are selected from the group consisting of hydrogen, methyl, ethyl, propyl, butyl, cyclohexyl, hydroxyl and phenyl, examples of which include N,N,N', N'-tetramethyl-1,3-butanediamine; and N,N,N', N'-tetramethyl-1,3-diamino-2-propanol;

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The following amendments are made to the claims to make the application in condition for allowance:

Claims 58-61 are cancelled (because they are directed to a microporous membrane, which are anticipated or made obvious by the Marinaccio ref).

New claim 79 is added

Claim 1 is amended to delete 'polyglycerol polyglycidyl ether' (because this compound is a reaction product of glycerol triglycidyl ether taught by Marinaccio and a diol), and Claim 17 is amended to delete certain compounds that are deemed new matter; amended claims are listed below:

1. (Currently amended) A composite polyamide reverse osmosis membrane comprising:
 - (a) a microporous support;
 - (b) a polyamide layer on said microporous support; and
 - (c) a hydrophilic coating on said polyamide layer, said hydrophilic coating being made by (i) applying to the polyamide layer a quantity of a polyfunctional epoxy compound, said polyfunctional epoxy compound selected from the group consisting of diglycerol triglycidyl ether; pentaerythritol triglycidyl ether; sorbitol triglycidyl ether; glycerol propoxylate triglycidyl ether; trimethylolpropane triglycidyl ether; 1,1,1-tris(hydroxymethyl)ethane triglycidyl ether; 1,1,1-tris(hydroxyphenyl)ethane triglycidyl ether;

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tris(hydroxymethyl)nitromethane triglycidyl ether; phloroglucinol triglycidyl ether; a reaction product of epichlorohydrin and 1,3,5,-tris(2-hydroxyethyl)cyanuric acid; a reaction product of epichlorohydrin and tris(hydroxymethyl)amino methane; sorbitol tetraglycidyl ether; pentaerythritol tetraglycidyl ether; polyglycerol tetraglycidyl ether; sorbitol pentaglycidyl ether; and sorbitol hexaglycidyl ether; ~~polyglycerol polyglycidyl ether~~, and (ii) then, cross-linking the polyfunctional epoxy compound in such a manner as to yield a water-insoluble polymer, wherein said polyfunctional epoxy compound is cross-linked through at least one of self-polymerization and the help of a cross-linking compound said cross-linking compound differing from said polyamide layer.

17. (Currently amended) The composite polyamide reverse osmosis membrane as claimed in claim 13 wherein said cross-linking compound is at least one member selected from the group consisting of N,N,N', N'-tetraethylethylenediamine; N,N,N', N'-tetramethylethylenediamine; ~~N,N,N', N'-tetraethyl-1,3-propanediamine~~; N,N,N', N'-tetramethyl-1,3-propanediamine; N,N,N', N'-tetramethyl-1,3-butanediamine; N,N,N', N'-tetramethyl-1,4-butanediamine; ~~N,N,N', N'-tetramethyl-1,5-pentanediamine~~; N,N,N', N'-tetramethyl-1,6-hexanediamine; ~~N,N,N', N'-tetramethyl-1,7-heptanediamine~~; N,N,N', N'-tetramethyl-1,8-octanediamine; 1,4-diazabicyclo[2.2.2]octane; 1,8-diazabicyclo[5.4.0]undec-7-ene; 1,5-

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diazabicyclo[4.3.0]non-5-ene; N,N,N', N',N''-pentamethyldiethylenetriamine; and 1,1,3,3-tetramethylguanidine.

79. (New) The composite polyamide reverse osmosis membrane as claimed in claim 1 wherein said polyfunctional epoxy compound is sorbitol tetraglycidyl ether.

Allowable Subject Matter

Claims 1-8, 11-17, 19, 20 and 79 are allowed.

The following is an examiner's statement of reasons for allowance:

With regard to the only independent claim, Claim 1, the closest prior arts are Mickols'853 and Marinaccio'839. Mickols teaches a polyamide reverse osmosis membrane having a surface coating of cross-linked polyepoxides formed from polydiglycidyl ethers, the cross-linking being with the polyamide under-layer, but does not teach or suggest (1) epoxides which are self-crosslinked or cross-linked with another cross-linking agent and (2) tri-epoxides. Marinaccio teaches a microporous polyamide membrane having a surface treatment of cross-linked poly diepoxides or triepoxides. However, Marinaccio does not teach or suggest a reverse osmosis membrane and does not teach or suggest the tri or polyepoxides claimed. Combining the references also would not provide all the limitations because the Marinaccio reference does not teach the tri-epoxides claimed. It would also be not obvious to one of ordinary skill in the art at the time of invention to combine the references themselves or with any others

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because of a lack of suggestion to do so. Remaining claims, being dependent on claim 1, are allowable.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan Menon
Patent Examiner


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